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Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals

Sub-Committee of Experts on the Transport of Dangerous Goods

Fifty-third session

Geneva, 25 June-4 July 2018
Item 6 (b) of the provisional agenda
Miscellaneous proposals for amendments to the Model Regulations on the Transport of Dangerous Goods: packagings

Minimum wall thickness for Metal IBCs*

Transmitted by the Stainless Steel Container Association (SSCA)**

Introduction

1. In the forty-fourth session (25 November-4 December 2013) SSCA presented the working document ST/SG/AC.10/C.3/2013/57 and the Sub-Committee has discussed the proposal deleting the minimum wall thickness requirements for metal IBCs.

2. At that time the majority of experts were against that proposal, although some said that they would accept the deletion of 6.5.5.1.6 provided that the wall thickness in mm continued to be required in the additional marking under 6.5.2.2. In their view, where metal IBCs were concerned, a minimum thickness was a safety measure, and it was necessary to be able to ascertain the degree of corrosion to the metal.

3. Moreover SSCA was requested to support its arguments by relevant data.

4. This document intends therefore (a) to remind to the arguments brought forward already with ST/SG/AC.10/C.3/2013/57 and (b) to deal with topic "minimum thickness as a

* The annex is reproduced as received.

** In accordance with the programme of work of the Sub-Committee for 2017–2018 approved by the Committee at its eighth session (see ST/SG/AC.10/C.3/100, paragraph 98 and ST/SG/AC.10/44, paragraph 14).

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safety measure in the context of corrosion", to support SSCA arguments with relevant data and to provide a text proposal on the information on the wall thickness.

5. Chapter 6.5 of the United Nations Model Regulations on the Transport of Dangerous Goods describes the requirements for the construction and testing of Intermediate Bulk Containers (IBCs).

6. As defined in 6.5.1.3 there is a wide range of IBCs (categories) manufactured with different materials in accordance with table 6.5.1.4.1 (b). The general principle for the manufacturing of IBCs is that they have – if applicable – to pass the different design type tests as described for example in 6.5.6.4 (Bottom Lift test), 6.5.6.5 (Top Lift test), 6.5.6.6 (Stacking test), 6.5.6.7 (Leakproofness test), 6.5.6.8 (Hydraulic Pressure test), 6.5.6.9 (Drop test), and 6.5.6.12 (Vibration test). The criterion for passing the tests is the "performance".

7. Except for metal IBCs, there are no requirements defined which relate to the design and extend beyond the performance criterion. It can therefore be assumed that all IBCs which pass the design type tests are safe for the transport of dangerous goods. Para. 6.6.6.1.1 describes the fundamental test requirements for IBCs: "Each IBC design type shall successfully pass the tests prescribed in this chapter before being used and being approved by the competent authority allowing the allocation of the mark. An IBC design type **is defined by** the design, size, material and **thickness**, manner of construction and means of filling and discharging but may include various surface treatments…". But only for metal IBCs there is a "Minimum Wall Thickness" requirement in 6.5.5.1.6 (and in the table in 6.5.2.2.1).

8. SSCA thinks that this requirement is still a vestige / remnant from former times when metal IBCs were derived from tank containers (cubical tank containers). These regulations had made provisions regarding minimal wall thickness (former German "Technische Richtlinien für kubische Tankcontainer TRKTC 001").

9. To treat all manufactures of IBCs in the same manner, SSCA proposes to delete the requirement "Minimum Wall Thickness" in 6.5.5.1.6 (and in the table in 6.5.2.2.1) **while retaining the information on the wall thickness**. The proposal is drafted below.

10. The deletion of the "minimum wall thickness" would lead to the effect that for manufacturers of metal IBCs the direct **access to innovation** and new developments is no longer blocked as it is today to a large extent.

11. The proposed revision would also help the manufacturers of metal IBCs to produce their metal IBCs in accordance with requirements coming from environmental legal regulations and customers' demands. Examples regarding the environmental aspect are the European Packaging and Packaging waste Directive (the packaging must meet certain "Essential Requirements") as well as the new ISO Standard series ISO 18601 (especially ISO 18602 "Packaging and the environment – Optimization of the packaging system"). The optimisation of the wall thickness – **while ensuring performance** – could contribute to the environment protection by the realisation of a lower packaging weight and the sustainable use of resources.

12. Regarding the topic "corrosion" the experts expressed their view that – where metal IBCs were concerned – a minimum thickness was a safety measure, and it was necessary to be able to ascertain the degree of corrosion to the metal. SSCA would like to explain that neither the prescribed thickness in 6.5.5.1.6 (a) nor the thickness calculated with the formula 6.5.5.1.6 (b) make able to ascertain the degree of corrosion to the metal. But anyway a corrosion allowance is not required on surfaces if they are adequately protected against corrosion or if the material as such is non-corrosive. That means the design, materials and construction should be selected to **minimise corrosion**.

13. (Metal) IBCs are "transport containers" that means they are periodically filled, emptied, cleaned and inspected and not foreseen to be used for storage. Therefore the cycles of filling and emptying are very short and corrosion – if despite selection of material at all possible – would be detected immediately and the **wall thickness can be measured at the periodic inspection**. This makes sure that the **extraordinary life time** of metal IBCs is remained and will not be affected.

14. Regarding the request to support arguments by relevant data SSCA has initiated a test. A protected metal IBC (31A) was successfully tested at TÜV Rheinland in Halle. The test report is attached in the **Annex**. We would like to summarise: As is evident from the test report, the wall thickness of the tested container is between 0.97 (top), 0.98 (body) and 1.42 (bottom). According to the 6.5.5.1.6 the wall thickness for metal IBC should in no case be less than 1.5 mm. In our view, the successful test illustrates, that this requirement is no longer appropriate.

15. SSCA would appreciate if this proposal would be considered by the Sub-Committee and if we were given the opportunity to introduce the paper.

Proposal

16. **Amend** the table in 6.5.2.2.1 by deleting "minimum" in the third row under "Additional marks", as follows:

"Body material and its ~~minimum~~ thickness in mm"

17. **Delete** 6.5.5.1.6.

Annex

Test report "Design type test of an intermediate bulk container (IBC) for the transport of dangerous goods" / Code: UN 31A

TÜVRheinland®
Genau. Richtig.

Prüfbericht
Test Report

Nr. / *No* 180065

1. Ausfertigung, Rev. 0 / original copy Rev. 0
Vom / *dated* 28.03.2018

Baumusterprüfung eines Kombinations-Großpackmittels (IBC)
für den Transport flüssiger gefährlicher Güter

Design type test of an intermediate bulk container (IBC)
for the transport of dangerous liquid goods

IBC 1000 L/D

UN 31A

Mindestwandstärke
/ Minimum wall thickness
1,0 mm

Prüfbericht *Test report by*	Dipl.-Ing. S. Hoyer
Prüfaufsicht *Test supervision by*	Dipl.-Ing. S. Hoyer
Prüfung *Test carried out by*	M. Behrend

TÜV Rheinland Industrie Service GmbH
Abteilung Verpackung und Gefahrgut
von der Bundesanstalt für Materialforschung und -prüfung (BAM) Berlin
anerkannte Prüfstelle für Gefahrgutverpackungen und Fremdüberwachung
TÜV Rheinland Industrie Service GmbH
Packaging and Dangerous Goods Division
qualified and recognised by the Federal Office for Materials Research and Testing [BAM, Berlin] as an inspection agency for packagings intended for use in the transport of dangerous goods and third party monitoring

TÜV Rheinland Industrie Service GmbH | Kölner Straße 33 06118 Halle | Telefon-Sammel-Nr. +49 345-6215-0 Telefon +49 345-6215-256 Telefax +49 345-6215-312 Service-IS@de.tuv.com | Geschäftsführung Andreas Gack (Sprecher) DIN Perera | Aufsichtsratsvorsitzender Dr. Michael Fuß | Köln HRB 28878 www.tuv.com

Rechtsgrundlagen / *Legal bases*

Gefahrgutverordnung Straße, Eisenbahn und Binnenschifffahrt in der Fassung der Bekanntmachung vom 30. März 2017 (2017 S.)
(German regulation concerning the transport of dangerous goods by road, rail and inland waterways)

Gefahrgutverordnung See vom 09. Februar 2016 (BGBl. I S. 182), die durch Artikel 14 der Verordnung vom 26. Juli 2016 (BGBl. I S. 1843) geändert worden ist
(German regulation concerning the transport of dangerous goods by sea)

Luftverkehrs-Zulassungs-Ordnung vom 19. Juni 1964 (BGBl. I S. 370), die zuletzt durch Artikel 1 der Verordnung vom 30. März 2017 (BGBl. I S. 683) geändert worden ist
(German regulation concerning the transport of dangerous goods by air)

Erklärung der Prüfstelle:

Die versandfertigen IBCs wurden in Übereinstimmung mit den entsprechenden Vorschriften nach ADR 2017, Abschnitt 6.5.6. geprüft.
Der Prüfbericht kann bei Anwendung anderer Verpackungsmethoden oder bei Verwendung anderer Verpackungsbestandteile ungültig werden.
The IBCs in a state ready for shipping were tested in accordance with the appropriate rules contained in ADR/RID 2017, section 6.5.6. This test report, however, may become invalid if package parts, or packaging methods other than tested are used or applied, respectively.

Veröffentlichungsrechte:

Die Verwendung von Angaben aus diesem Prüfbericht zur Veröffentlichung ist nur mit Quellenangabe zulässig und bedarf der Zustimmung des Auftraggebers. Auszugsweise Veröffentlichungen bzw. Wiedergabe bedürfen zusätzlich der Zustimmung der Prüfstelle.
Publication of this test report is not permitted unless reference is made and the client's approval obtained. Part publication and/or reproduction require in addition the inspection agency's specific approval.

Abschnitt I / *Section I*

Bauartmerkmale / *Design Features*

1. Antragsteller / Hersteller / *Applicant / Manufacturer*

Thielmann UCON GmbH
Gustav-Rivinius-Platz 2
77756 Hausach

Tel.: 07831-77231 / Fax: 07831-77209
Ansprechpartner:/ *Contact person:*
Herr Landschütz

Inhalt des Prüfauftrags / *Scope of Testing Order*

Inhalt des Antrags *Contant of proposal*	Baumusterprüfung an einem 1000-l-Großpackmittel (IBC) aus Stahl *Design type test of an 1000-l-intermedian bulk container (IBC) made from steel*			
Herstellerbezeichnung *Manufacturer's description*	IBC 1000 L/D			
Prüfbedingungen / *Test specifications*				
Prüfflüssigkeit *test liquid*	V-Grp *Pack.-Group*	Dichte (kg/l) *Density*	Stapelung (Lagen aufgestapelt) *Stackable*	Innendruck (kPa) *Intern. pressure*
Wasser / *water*	II	1,2		65 / 200

2. Prüfergebnis / *Test Results*

Siehe Abschnitt II dieses Berichtes
See in Section II of this test report.

3. Baumusterbeschreibung / *Design Type Description*

3.1. Zeichnungen / Werkstoffe / *Drawings / materials*

Benennung / *description*	**Zeichnungs-Nr.** *drawing no.*	**Werkstoff**[1] *material*	**Anlage Nr.** *annex*
IBC 1000 L/D 1070 4301-2B Schraubd. DN 400	15.100.001280 vom/*dated* 27.03.2018	Siehe Stückliste/ *see parts list*	1 Blatt 1 *1 sheet 1*
Stückliste / *parts list*	15.100.001280 vom/*dated* 27.03.2018		1 Blatt 2 bis 3 *1 sheet 2 to 3*

3.2. Hauptabmessungen / *Main Dimensions* (mm)

Benennung / *Description*	Zeichnungsmaß *size according to drawing*	Istmaß *actual size*
Länge des IBC / *length of IBC*	1200	1201
Breite des IBC / *width of IBC*	1100	1100
Höhe des IBC / *height of IBC*	1660	1662
Durchmesser Einfüllöffnung *diameter of charging hole*	400	398
Wanddicken / *wall thickness*: Mantelblech/ Oberboden/Unterboden *Cylindrical Shell/ top bottom/ down bottom*	1,0/1,0/1,5	0,98/0,97/1,42

3.3. Volumen / Massen / *Cubic Contents / Weights*

Benennung / *description*	Istwert / *actual value*
max. Fassungsraum / max. volume content (l)	1010
Taramasse / *tare weight* (kg)	217,6

[1] Nach Angabe des Herstellers

Abschnitt II / *Section II*

Bauartprüfung / Design Type Testing

1. Probenahme / *Sampling*

Die Bereitstellung von 1 Prüfmuster erfolgte durch den Auftraggeber.
The test sample was provided by the client.

2. Prüfumfang / *Scope of testing*

Prüfmuster *test samples*	Prüfverfahren *test method*	Prüfvorschrift *test specification*	
		ADR/RID Pkt. *paragraph*	IMDG-Code Pkt. *paragraph*
1	Vibrationsprüfung *vibration test*	6.5.6.13	
1	Innendruckprüfung *internal pressure test*	6.5.6.8	
1	Fallprüfung *drop test*	6.5.6.9	

3. Durchführung der Prüfung / *testing*

Vibrationsprüfung / vibration test

Prüfeinrichtung *test equipment*	Vibrationstisch *vibration table*
Fixierung des IBCs gegen seitliche Verschiebung *fixation against lateral displacement*	mit dem Vibrationstisch verschraubte Metallstücke *metal plates fixed on vibration table*
Anzahl der Prüfmuster *number of test samples*	1
Füllgut für die Prüfung / Füllgrad *material filled-in for testing / filling level*	Wasser / >98 % *water / >98%*
Prüffrequenz *test frequency*	3,32 Hz
Vertikale Auslenkung des IBCs bei Prüffrequenz *vertical deflection during test frequency*	>1,6 mm
Kontrolle der Auslenkung *control of vertical deflection*	Unterschieben des Prüfbleches der Abmessung Länge >100 mm, Breite >50 mm, Dicke 1,6 mm an verschiedenen Stellen der Palettenkufen *push a metal testsheet length >100mm, width >50mm, thickness 1,6mm underneath different points of the skid palett*
Prüfdauer *duration of testing*	60 min
Prüfergebnis *test result*	kein zu Bruch gehen bzw. Versagen der baulichen Ausrüstungsteile und keine Undichtheit erkennbar *no cracks, failures of the components and no leaking visible*

Innendruckprüfung (hydraulisch) / *Internal pressure (hydraulic) test*

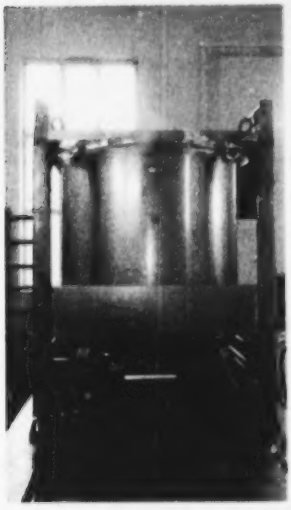
Prüfmedium *test medium*	Leitungswasser *tab water*
Druckeinleitung *pressure charging*	Über G 1" Stutzen *through nozzles G1"*
Druckmessgerät *pressure gauge*	Manometer 0-160 kPa, Klasse 1,0 *manometer 0-160 kPa, class 1,0*
Anzahl der Prüfmuster *number of test samples*	1
Prüfdauer *duration of testing*	10 min je Stufe / *10 min for each step*
Prüfdruck / Ergebnis / *test result test pressure /*	**1. Stufe: 65 kPa** keine bleibenden Verformungen erkennbar / *no deformations visible* **2. Stufe: 200 kPa** keine Undichtheiten und keine die Sicherheit des IBCs beeinträchtigende bleibende Verformung erkennbar / *no leakage and permanent deformations visible defacing the safety of IBC*

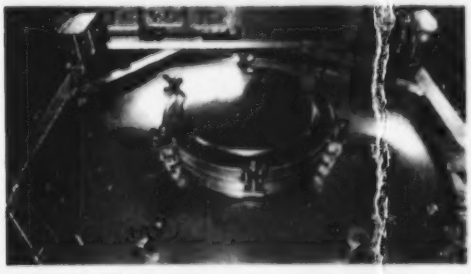
Fallprüfung / *Drop test*

Fallfundament *impact surface*	Stahlbetonfundament mit aufgesetzter Stahlplatte, 100 mm dick, Gesamtmasse: >50 t *steel plate, 100 mm thick, horizontally placed onto reinforced concrete foundation; total weight approx. 50 metric tons*
Fallvorrichtung *dropping mechanism*	Fallhaken mit elektromechanischer Auslösung *drop-hook with electro mechanical tripping device*
Füllgut für die Prüfung *material filled-in for testing*	Wasser mit Frostschutzmittel *water, with anti-freezing compound added*
Füllgrad *filling level*	>98 % des Fassungsvermögens *> 98 % of rated capacity*
Anzahl der Prüfmuster *number of test samples*	1
Prüfmustertemperatur *temperature of test sample*	10 °C
Fallhöhe *dropping height*	1,2 m
Fallausrichtung *orientation of drop*	flach / auf dem Boden *flat / onto the bottom*

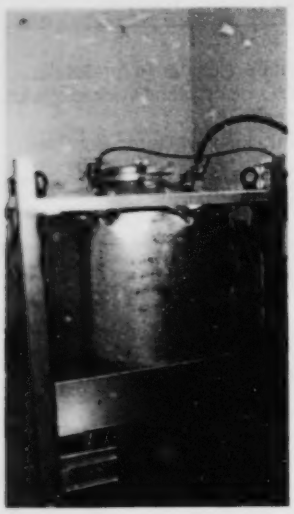
Prüfergebnis *test result*	nach Aufprall: Deformationen im Bereich der Aufprallstelle, kein Füllgutaustritt - dicht nach Druckausgleich nach 5 Min hängend: kein Füllgutaustritt - keine weiteren Schäden *after impact:* *deformations visible, tight after pressure compensation* *after 5min hanging:* *no leaking, no other damage*

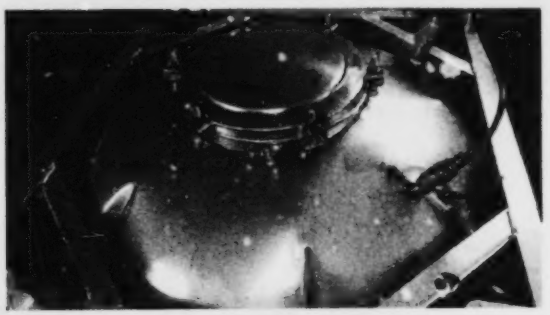
Fotodokumentation / *documentation with photos*



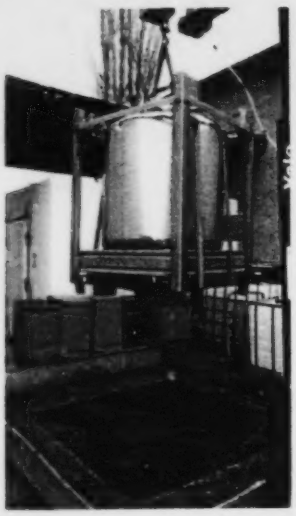


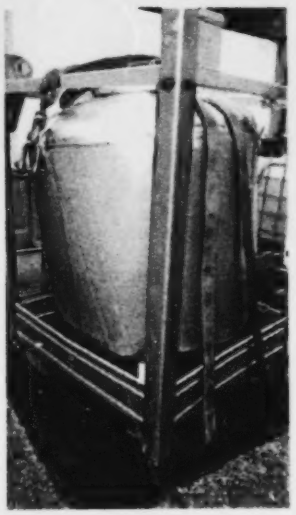
Prüfmuster vor dem Vibrationstest/
Sample before vibration test





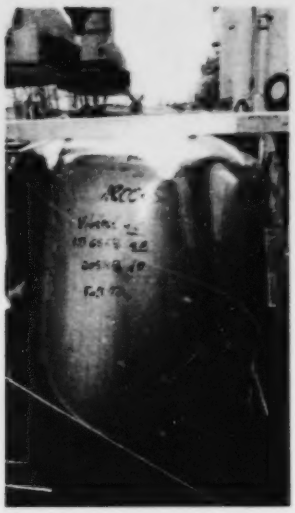
Hydraulische Innendruckprüfung / *internal pressure (hydraulic test)*





Falltest /*drop test*

Prüfmuster nach der Fallprüfung / *sample after drop test*



Deformationen nach dem Falltest / *deformations after drop test*

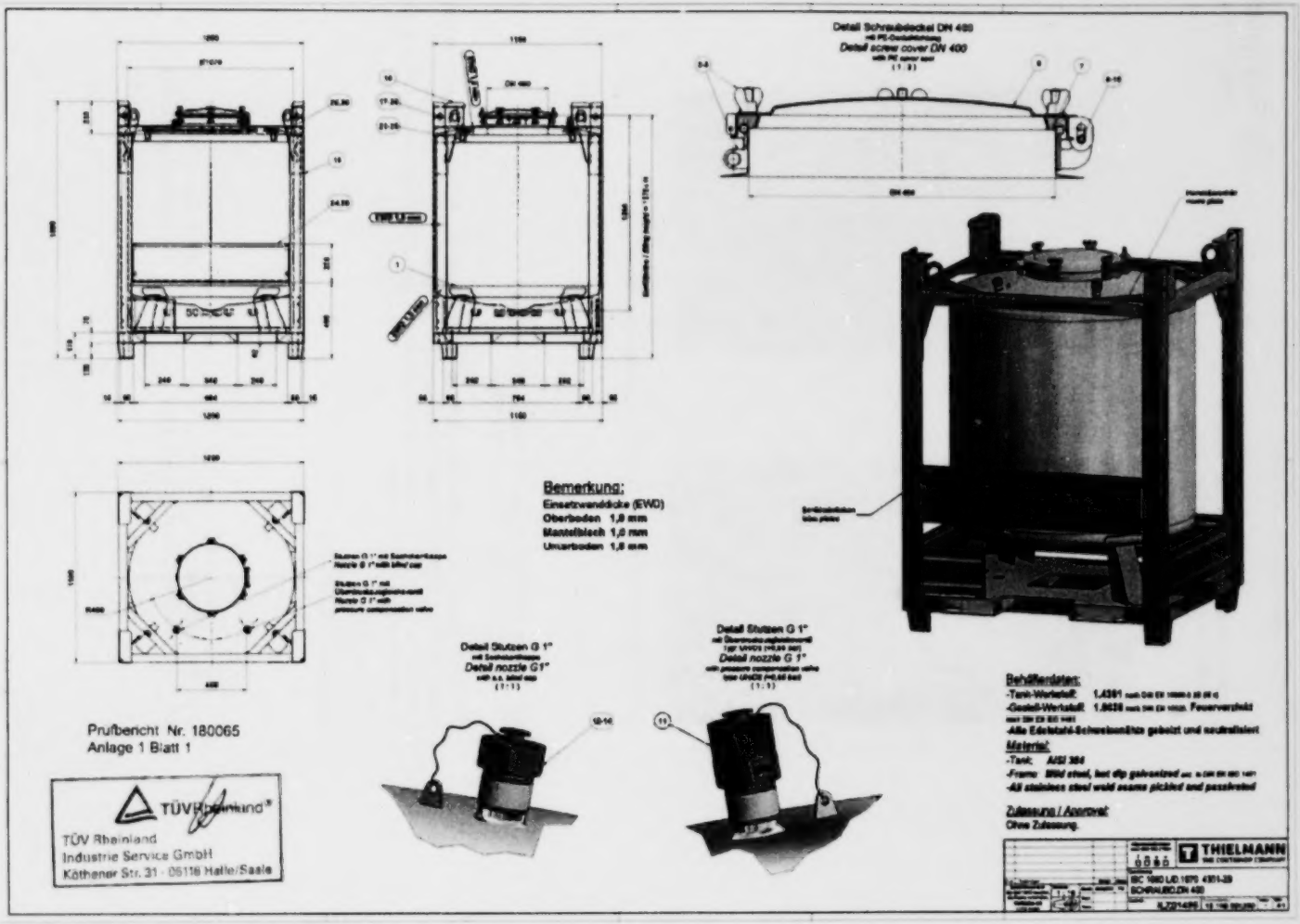
Der Prüfbericht besteht aus 10 Seiten und 1 Anlage.
This test report comprises 10 pages and 1 annex.

Er wurde erstellt in 2 Ausfertigungen zur Verwendung des Antragstellers sowie einer Kopie der 1. Ausfertigung zum Verbleib in der Prüfstelle.
The report is made out in two original copies to be used by the applicant, plus one copy of the first original to be retained by the Inspection Agency.

Halle, den 28.03.2018

Dipl.-Ing. S. Brandt
Leiter der Prüfstelle / Head of Test laboratory

Dipl.-Ing. S. Hoyer
Sachverständiger / Expert


Detail Schraubdeckel DN 400
Detail screw cover DN 400
Bemerkung:
Einsetzwanddicke (EWD)
Oberboden 1,8 mm
Mantelblech 1,8 mm
Unterboden 1,8 mm
Detail Stutzen G 1"
Detail nozzle G 1"
Detail Stutzen G 1"
Detail nozzle G 1"
Prüfbericht Nr. 180065
Anlage 1 Blatt 1
TÜV Rheinland
Industrie Service GmbH
Köthener Str. 31 · 06118 Halle/Saale
Behälterdaten:
-Tank: AISI 304
Material:
Zulassung / Approval:
Ohne Zulassung.
THIELMANN

Líneas

THIELMANN UCON GmbH

Código de artículo	Nombre del producto	Grupo de artículos	Número de plano	Índice
[illegible]	IBC 1000 L/D.1070 4301-28 SCHRAUBD.DN 400	[illegible]	15.100.001280	

L. MAT	Nombre	Cantidad inicial	Desde fecha	Hasta fecha	Activo	Aprobado por	Aprobado
[illegible]	IBC 1000 L/D.1070 4301-28 SCHRAUBD.DN 400/EBRO-DN 80-KAMI.	1,00			SI	1103000	SI

Puesto	Código de artículo	Cantidad	Por serie	Unidad	Nombre del producto	Número de operación	Normativo Din	Número de plano	Índice	Información extra de artículo	Material	Peso neto	Grupo de cobertura
10	W6M12145	1,0000	1	Pcs	TANK IBC 1000 L/D.1070 4301 DN 400 -2 STU. G1			10.200.0012 96		1070	1.4301 28 (III C)	0,00	[illegible]
20	W6402358 E803661	1,0000	1	Pcs	KRAGENRING 400 KPL. 4301 6L/T-SCHR./MS-FLÜ-MU - M.SCHA			86.020.0233 033	B	400	1.4301	2,26	[illegible]
30	X0600071 0400201	1,0000	1	Pcs	6KT-SCHRAUBE M 10 X 40 A2 DIN 931					10x40	A2	0,03	[illegible]
40	X0600929 0500956	1,0000	1	Pcs	SCHEIBE 10.5 A2 DIN 125					10.5	A2	0,00	[illegible]
50	X0600148 0400377	1,0000	1	Pcs	6KT-MUTTER M 10 A2 SELBSTSICHERND					10	A2	0,01	[illegible]
60	W6400044 E800664	1,0000	1	Pcs	SCHRAUBDECKEL DN 400 4301 6L/SCHARN./GEHEFTET - STANDAR			86.030.5000 000		400	1.4301 IIIC/2B	4,20	[illegible]
70	X6400161 0700646	1,0000	1	Pcs	DECKELDICHTUNG DN 450 PE TPY PE-EV 55, WEISS 25X18					400	PE-EV55	0,00	[illegible]
80	X0600968 0500111	1,0000	1	Pcs	BOLZEN 8 X 136 X 126 A2 MIT SPLINTLOCH					8x136x126	A2	0,05	[illegible]
90	X0600934 0500965	2,0000	1	Pcs	SCHEIBE 8,4 A2 DIN 9021					8,4	A2	0,00	[illegible]
100	X0600908 0500321	2,0000	1	Pcs	SPLINT 2 X 16 A2					2x16	A2	0,00	[illegible]
110	W6400050 K805070	1,0000	1	Pcs	ÜBERDRUCKAUSGLEICHSEIN-RICHTUNG 1" TYP UH/D2			86.036.0151 000	G		1.4401/1.4 408	0,00	[illegible]
120	X0300154 0400147	1,0000	1	Pcs	SECHSKANTKAPPE G 1" 4408 PLOMBIERBAR GEW DIN/ISO 228/			86.036.0005 000	G	1	1.4408 (1.4401)	0,00	[illegible]
130	X0400058 0700067	1,0000	1	Pcs	DICHTSCHEIBE D 52 X 2 PTFE					52X2	TEFLON (PTFE)	0,00	[illegible]
140	X0500488 0600790	2,0000	1	Pcs	DRAHTSEIL 1,5 DRM. (265) 4401 LÄNGE 265 MM/ 255 MM			86.036.0065 000	D	1,5x265x255	1.4401	0,02	[illegible]

Prüfbericht Nr. 180065
Anlage 1 Blatt 2

TÜV Rheinland®
TÜV Rheinland
Industrie Service GmbH
Kothener Str. 31 · 06118 Halle/Saale

ST/SG/AC.10/C.3/2018/34

15

Líneas

THIELMANN UCON GmbH

150	W8408646 K8095291	1,0000	1	Pcs	GESTELL IBC 1000 L 1660H VERZ UCON-BLENDEN (L) -4 ANSCHL	15.235.0001 77	1100X1200X1660	STAHL VERZINKT	130,74	MTD-F
160	WR401136 K901334	1,0000	1	Pcs	NIEDERHALTERAHMEN - STANDA.VERZ 210 H / GESTELL 1100X1200 -IB	15.230.0000 03	1094X1194X210	STAHL VERZINKT	0,00	MTS-KMZ
170	K0400327 0400676	8,0000	1	Pcs	SENK-SCHRAUBE M 10 X 25 VZ DIN 7991		10X25	STAHL VERZINKT	0,00	MTS-SR
180	K0400144 0400375	8,0000	1	Pcs	6KT-MUTTER M 10 VZ DIN 934		10	STAHL VERZINKT	0,00	MTS-MU
190	K0400935 0500068	8,0000	1	Pcs	SCHEIBE 13,0 A2 DIN 9021		13	A2	0,00	MTS-SU
200	K0400955 0500095	8,0000	1	Pcs	FEDERRING B 10,0 VZ		10,2	STAHL VERZINKT	0,00	MTS-SU
210	W6400037 K800015	4,0000	1	Pcs	GUMMIHALTERUNG KPL 4301 FÜR TP, IBCZ, LTP, LBP	65.002.0030 B 000	-	1.4301	0,00	MTS-PSH
220	K1400372 J800117	4,0000	1	Pcs	GUMMIPUFFER KLEIN NR CA. 65 GRAD SHORE, SCHWARZ			NATURKAUTSCHUK (NR)	0,00	MTS-SE
230	K0400186 0400446	4,0000	1	Pcs	6KT-MUTTER M 12 A4 DIN 439		12	A4	0,00	MTS-MU
240	W1003074 K002662	1,0000	1	Pcs	SCHILDERBRÜCKE 250 X 1800 VERZ FÜR GESTELL 1160 X 1200	770.009.002. F 000	BL1,5X285X1800	STAHL VERZINKT	0,00	MTS-STH
250	W1005106 K005983	1,0000	1	Pcs	FIRMENSCHILD -STANDARD- 4301 FÜR CONT. O. ZULASSUNG	40.315.0002 55	BL2,0X47X135	1.4301	0,10	MTT-KSH
260	K0401409 0501604	4,0000	1	Pcs	BLINDNIET 4,8 X 10 A2 TYP: UE4810EF (UNIVERSALNIET)		4,8X10	A2	0,00	MTS-SN

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Anlage 1 Blatt 3

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